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NEW AND OLD LAND SHELLS FROM THE ISLAND OF LUZON PHILIPPINES

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Several small sendings of land mollusks from the island of Luzon transmitted to the United States National Museum for determination by the Philippine Bureau of Science, have necessitated a revision of certain species of *Cochlostyla*, the results of which are given in the following pages. There are also added descriptions of a new species of *Leptopoma* and a new subspecies of *Obba* and *Sulfurina*, which were included in the same sending.

The illustrations accompanying this paper are from photographs made by the Division of Photography, United States National Museum, and retouched by Mrs. Aime M. Awl.

COCHLOSTYLA DUBIOSA Pfeiffer

In the genus *Cochlostyla*, there is probably no species which to-day presents a greater confusion of elements in collections than exists in the complex which is usually designated under the foregoing name. This has been largely caused by the fact that the collectors of old were not cognizant of the important rôle of what is to-day called Zoogeographic distribution. Then it was not known that most species or their races have a rather limited locus. The early collector therefore usually placed specimens of more or less superficial resemblance together and a label "Philippine Islands," seemed quite adequate to denote their country. Cuming, the most prolific of the early Philippine collectors, did somewhat better, as a rule, by citing the island from which his specimens came.

The describers of species, working upon Cuming's collections, cautiously gave a wide distribution to many of the forms described by them. Many of the forms cited as coming from islands other than those from which the type came, have since been recognized as distinct species or subspecies by later writers.

Pfeiffer in describing *Helix dubiosa* in 1845 in the Proceedings of the Zoological Society of London (pp. 125–6) says: "This is the

shell figured by Mr. Reeve under the name *H. decipiens*, Sowerby [1] and this figure quite well represents what I consider *Cochlostyla dubiosa*. It was more than likely based upon one of Cuming's shells from the island of Samar. Pfeiffer also says that his species was "Collected by Mr. Cuming on the island of Samar."

A year later Pfeiffer redescribes and figures *Helix dubiosa* in the Conchylien Cabinet of Martini and Chemnitz (p. 281, pl. 46, figs. 5 and 6). The description is a copy of his former definition, but the figure represents one of the races of what I am here calling *Cochlostyla submirabilis* Möllendorff. This was the beginning of the confusion that has since prevailed.

Cochlostyla dubiosa Pfeiffer closely resembles *Cochlostyla submirabilis* both in shape and color markings. Both may or may not have a dark umbilical area and one to three brown spiral zones. In all our *Cochlostyla dubiosa* the brown zones are never peripheral but, when present, sub or supraperipheral, always leave a light zone at the periphery. In *Cochlostyla submirabilis* on the other hand, if a dark zone is present on or near the middle of the whorl it always occupies the peripheral area. Both species have hydrophanous spiral lines or bands of varying width. The most significant distinguishing character however is the presence of very regular closely spaced strongly incised spiral lines in *Cochlostyla dubiosa*. These lines are present both on the areas occupied by the hydrophanous bands and the spaces between them, on spire and base. In *Cochlostyla submirabilis* Möllendorff incised spiral lines, if present at all, are merely indicated and never regularly developed, nor do they cover the entire surface of the shell. This species also has a tendency to be provided with crisscross scratchy lines.

Two other species with which some races of both of these species have been confused are *Cochlostyla mirabilis* Ferussac and *Cochlostyla persimilis* Ferussac. The races of these while in some instances approximating *Cochlostyla submirabilis* Möllendorff can be easily distinguished from them by the absence of the hydrophanous spiral zones. In *Cochlostyla mirabilis* there is scarcely any periostracum, the shells usually being of white ground color. In *Cochlostyla persimilis*, on the other hand, there is always a strongly developed straw-colored, pale orange or brownish orange periostracum present.

Cochlostyla speciosa Jay has been referred to *C. dubiosa* by some authors. Through the kindness of the American Museum of Natural History I have been able to examine the two fine specimens upon which Jay based his name. They do not belong here but are allied to *Cochlostyla coccomelos* Sowerby.

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[1] Conchologia Systematica, vol. 2, pl. 145, fig. 16.

A KEY TO DIFFERENTIATE SPECIES OF COCHLOSTYLA

Hydrophanous lines and bands present.
  Strongly incised spiral lines present on spire and base----------**dubiosa.**
  Strongly incised spiral lines absent on spire and base---------**submirabilis.**
Hydrophanous lines and bands absent.
  Periostracum strongly developed----------**persimilis.**
  Periostracum almost absent----------**mirabilis.**

Of *Cochlostyla dubiosa* Pfeiffer three races, which I shall recognize subspecifically, are in the collection of the United States National Museum. The typical race comes from the island of Samar, another from the small island of Capul off the northwest coast of Samar, which I shall call *Cochlostyla dubiosa capulensis*, and the third *Cochlostyla dubiosa volubilis* Reeve from the island Batan, of the Batanes Group, the northernmost of the Philippine Islands.

This discontinuous distribution, presented by the last mentioned race, has puzzled all the writers who have given serious thought to the problem. Von Möllendorff has suggested introduction with plants. This seems not unlikely since Batan Island was given considerable prominence during Spanish occupation. The fact that the other islands of the Batanes Group have not yielded the same or allied races adds additional color to this contention. The Batan shells differ sufficiently from those of Samar and Capul to deserve a name. It would be interesting to know from where they came originally, in order to determine whether the characters which they present are still the same as those of the ancestral stock or whether they are the responses to the more northern environmental conditions.

The following brief description and figures should help to recognize these races:

COCHLOSTYLA DUBIOSA DUBIOSA Pfeiffer

Plate 1, Figures 1–4.

1842. *Helix decipiens* REEVE, Conch. syst., vol. 2, pl. 165, fig. 16 (not pl. 163, fig. 3).
1842. *Helix dubiosa* PFEIFFER, Symbolae II, p. 71.
1845. *Helix dubiosa* PFEIFFER, Proc. Zool. Soc. London, pp. 123–4.
1846. *Helix dubiosa* PFEIFFER, Martini-Chemnitz, Conch. Cab., ed. 2, vol 1, part 12, p. 281 in part, exclusive of figures.
1848. *Helix dubiosa* PFEIFFER, Monogr. Helic. vivent., vol. 1, p. 252 in part.
1850. *Helix dubiosa* ALBERS, Heliceen, ed. 1, p. 105.
1851. *Helix dubiosa* REEVE, Conch. Icon., pl. 5, fig. 22.
1853. *Helix dubiosa* PFEIFFER, Mon. Helic. vivent., vol. 3, p. 188, in part.
1853. *Helix dubiosa* PFEIFFER, Mon. Helic. vivent., vol. 3, p. 172, in part.
1858. *Helix dubiosa* H. and A. ADAMS, Gen. Rec. Mol., vol. 2, p. 192.
1859. *Helix dubiosa* PFEIFFER, Mon. Helic. vivent., vol. 4, p. 210, in part.

1860. *Helix dubiosa* MARTENS, Albers, Heliceen, ed. 2, p. 172.
1868. *Helix dubiosa* PFEIFFER, Mon. Helic. vivent., vol. 5, p. 283, in part.
1870. *Cochlostyla dubiosa* SEMPER, Philippinen, pt. 2, vol. 3, p. 180, in part.
1870. *Cochlostyla mirabilis* SEMPER, Philippinen, pt. 2, vol. 3, p. 192.
1876. *Cochlostyla dubiosa* PFEIFFER, Mon. Helic. vivent., vol. 7, in part, p. 324.
1881. *Cochlostyla dubiosa* PFEIFFER, Clessin Nomenclator, p. 203.
1887. *Cochlostyla dubiosa* HIDALGO, Journ. Conchyl., vol. 35, p. 145, in part.
1891. *Cochlostyla dubiosa* PILSBRY, Man. Conch., ser. 2, vol. 7, pp. 135–6, in part, pl. 32, fig. 52.
1896. *Cochlostyla dubiosa* HIDALGO, Journ. Conchyl., vol. 44, pp. 5–8, in part.
1897. *Cochlostyla mirabilis* MÖLLENDORFF, Nachr. Deut. Malak. Ges., vol. 29, pp. 127–9, in part.
1898. *Cochlostyla mirabilis* MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, p. 113.
1901. *Cochlostyla dubiosa* HIDALGO, Obras, Malac., p. 303–6, in part.
1907. *Cochlostyla mirabilis* MÖLLENDORFF, Kobelt and Winter, Semper. Reis. Arch. Philip., vol. 10, pt. 7, pp. 148–9, in part, pl. 30, fig. 1?.

In the collection of the United States National Museum are two shells, Cat. No. 104053, U.S.N.M., from Samar which have the light peripheral zone bordered above and below by a broad band of chestnut brown. There is also a faint band of brown present at the summit. One of these shells has a brown unbilical area, while in the other there is scarcely an indication of a darker coloration present in this area. The rest of the last whorl is horn colored with indications of hydrophanous bands. Both of our shells are considerably weathered, therefore the poor showing of the hydrophanous marking. The early turns are flesh colored excepting a narrow zone of brown at the summit and the suture. The peristome is broadly expanded and reflected and white. The interior of the aperture is pearly white except where the dark spiral zones show through the substance of the shell. The incised spiral lines are rougher than in the other two races, in fact the shells have a coarser appearance in every way. These shells have 4.5 and 4.3 whorls, respectively, and measure—height, 32.2 and 27.6 mm.; greater diameter, 34.3 and 32.4 mm.; lesser diameter, 29.3 and 26.8 mm.

COCHLOSTYLA DUBIOSA VOLUBILIS Reeve

Plate 1, Figures 9–12

1851. *Helix batanica* REEVE, Conch. Icon., pl. 9, fig. 2 (not *Helix batanica* Adams and Reeve 1847 of Voyage of the Samarang).
1851. *Helix volubilis* REEVE, Conch. Icon., see errata.
1853. *Helix dubiosa* PFEIFFER, Mon. Helic. vivent., vol. 3, p. 188, in part.
1859. *Helix dubiosa* PFEIFFER, Mon. Helic. vivent., vol. 4, p. 210, in part.
1876. *Helix decipiens* PFEIFFER, Mon. Helic. vivent., vol. 7, p. 324, in part.
1881. *Helix dubiosa* PFEIFFER, Clessin Nomenclator, p. 203, in part.

1887. *Cochlostyla batanica* HIDALGO, Journ. Conchyl., vol. 35, p. 145, in part.
1890. *Cochlostyla dubiosa* PILSBRY, Man. Conch., ser. 2, vol. 7, pp. 135–6, in part, pl. 32, fig. 53.
1894. *Cochlostyla dubiosa* PILSBRY, Man. Conch., ser. 2, vol. 9, p. 222.
1896. *Cochlostyla batanica* HILDALGO, Journ. Conchyl., vol. 44, pp. 6–7, in part.
1896. *Cochlostyla speciosa* HILDALGO, Journ. Conchyl., vol. 44, pp. 8–9, in part.
1897. *Cochlostyla batanica* MÖLLENDORFF, Nachr. Deut. Malak. Ges., vol. 29, pp. 127–9.
1898. *Cochlostyla dubiosa batanica* MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, p. 113.
1901. *Cochlostyla batanica* HIDALGO, Obras Malac., p. 303, pl. 28, fig. 4.
1905. *Cochlostyla dubiosa batanica* MÖLLENDORFF, Kobelt and Winter, Semper Reix. Arch. Philip., vol. 10, pt. 7, p. 150, pl. 30. fig. 2.

The race from the island of Batan averages a little smaller in all dimensions than *Cochlostyla dubiosa capulensis*. It is also less brilliantly colored with the incised spiral lines a little more strongly developed.

The specimen figured is an average specimen, collected by Quadras at Santo Domingo de Vasco. It has 4.5 whorls and measures—height, 28.9 mm.; greater diameter, 33.2 mm.; lesser diameter, 25.1 mm.

COCHLOSTYLA DUBIOSA CAPULENSIS, new subspecies

Plate 1, Figures 5–8

This race from the island of Capul is the most elegant of the three. The lines of growth and incised spirals are fewer than in the other two races, and the shell has a smoother aspect. Here too the brown band at the summit is narrow, while those above and below the periphery are broad. The umbilical area is not darker than the rest of the base. The ground color of the last turn is bright horn colored where the diaphanous bands have been worn away. The early turns are white, the middle ones flesh colored with a pale zone of brown at the summit and the suture.

The type, Cat. No. 315731, U.S.N.M., an average specimen, has 4.8 whorls and measures—height, 32.0 mm.; greater diameter, 33.1 mm.; lesser diameter, 26.9 mm.

COCHLOSTYLA SUBMIRABILIS Möllendorff

This species as we have mentioned under *Cochlostyla dubia* Pfeiffer has been in part confused with that species and some of the races have been confounded with *Cochlostyla mirabilis* Ferussac. From *Cochostyla dubia* it is distinguished by the extremely reduced, practically absent, incised spiral lines, while the presence of hydrophanous spiral bands distinguish it from *Cochlostyla mirabilis* Ferussac.

Cochlostyla submirabilis Möllendorf appears confined to southern Luzon, ranging from the south side of Laguna de Bay to Albay Province. It appears to be a species that easily responds to local environment, and therefore breaks up into quite a number of races.

These races present variations that range in shape from ovoid to helicoid; some are unicolor, that is, excepting the hydrophanous lines and zones, which are found on the entire surface of its shell. Others may have only a dark chesnut colored area about the umbilicus, still others may have in addition a dark band at the summit. A peripheral dark zone is present in some and an additional spiral band of chesnut may be present between summit and periphery. These spiral bands vary in width also. The most highly banded form has therefor a dark umbilical area, a peripheral zone, one between periphery and summit, and another at the summit.

From north southward I recognize the following races:

Cochlostyla submirabilis banosana from the mountains near Los Banos, Laguna Province.

Cochlostyla submirabilis majayjayana from the northwest watershed of Mount Banahao, Majayjay, Laguna Province.

Cochlostyla submirabilis lucbana from the east slope of the Mount Banahao complex.

Cochlostyla submirabilis tayabasana from the south slope of the Mount Banahao complex at Tayabas.

Cochlostyla submirabilis antimonana from the region about Antimonan a little south of the middle of the western shore of Lamon Bay.

Cochlostyla submirabilis submirabilis Möllendorff from Lopez east of the southeastern end of Lamon Bay.

Cochlostyla submirabilis daragana from Daraga, Albay Province.

In addition to these we will probably have to recognize a race from Mount Maquiling, of which I have only dead bones too poor to furnish a description. These shells are nearest related to *Cochlostyla majayjayana.*

Another shell, also very dead, which I collected at Mariveles may, if an indigenous race, need a name. It may, however, be a hermit crab carried individual.

These races may be briefly diagnosed as follows:

COCHLOSTYLA SUBMIRABILIS BANOSANA, new subspecies

Plate 2, Figures 1–4

Shell small, subglobular, rather heavy, with the whorls decidedly rounded. Early whorls brown, the last turn and a half yellow orange, darkening toward the aperture. Peristome white, inside of aperture bluish white. No dark bands are present nor is there

a dark umbilical area. The hydrophanous bands are mostly worn away in the type, they are of varying width, the broadest being at the summit.

The type, Cat. No. 311075, U.S.N.M., has almost 5 whorls and measures—height, 29.2 mm.; greater diameter, 31.7 mm.; lesser diameter, 26.0 mm.

The type comes from the mountains near Los Banos, Laguna Province, Luzon.

In size this subspecies resembles *Helix submirabilis lucbana*, but it is of much heavier texture and lacks the spiral color bands. It is also more elevated.

HELICOSTYLA SUBMIRABILIS MAJAYJAYANA, new subspecies

Plate 2, Figures 5–8

Shell subglobose of strong texture. Whorls quite strongly rounded. The ground color varies from straw color to pale brown, the earlier whorls usually being darker than the rest. The umbilical area is bordered by a dark zone and a broad dark band is present at the summit of the whorls. The entire surface of spire and base is marked by hydrophanous spiral bands as shown in our figures.

The type and four additional specimens were collected by Francisco Rivera at Majayjay, Laguna Province, Luzon. I also collected it above the falls at Botocan, not far from Majayjay.

The type, Cat. No. 312943, U.S.N.M., has 5.1 whorls and measures—height, 35.7 mm.; greater diameter, 36.4 mm.; lesser diameter, 29.6 mm.

The largest specimen has 5.0 whorls and measures—35.1 mm.; greater diameter, 41.2 mm.; lesser diameter, 32.2 mm. The smallest specimen has 5 whorls and measures—height, 35 mm.; greater diameter, 34.7 mm.; lesser diameter, 28.8 mm.

This is the largest of the globular races. It is brilliantly colored. It most nearly resembles *Cochlostyla submirabilis tayabasana*, from which it is easily distinguished by its much larger size.

Paratypes are in the collection of the Philippine Bureau of Science.

COCHLOSTYLA SUBMIRABILIS LUCBANA, new subspecies

Plate 2, Figures 9–12

Shell small, subglobular, rather thin, early whorls light or dark, ground color of the later whorls olivaceous straw colored. There is a dark umbilical area and a dark band at the suture. Peristome white. Interior of aperture bluish white. The hydrophanous spiral zones are of very variable width, the broadest being at the summit.

The type, Cat. No. 47901, U.S.N.M., has 4.5 whorls and measures—height, 28.0 mm.; greater diameter, 30.3 mm.; lesser diameter, 24.5 mm. It was collected at Lucban, Tayabas Province, Luzon.

In size this race resembles *Cochlostyla submirabilis banosana*. The spire here, however, is less elevated, the whorls more inflated, and the shell of much thinner texture.

COCHLOSTYLA SUBMIRABILIS TAYABASANA, new subspecies

Plate 3, Figures 1–4

Shell subglobose, quite thin, whorls inflated, well rounded. Early whorls brown, straw, or flesh colored, the succeeding turns may be straw colored, light or darker brown. The umbilical area is dark chestnut brown and a spiral band of the same color marks the summit. Peristome white. Interior of aperture bluish white. The hydrophanous spiral bands are of varying width, the widest being at the summit, as may be seen by our figures.

The type, Cat. No. 195436, U.S.N.M., has almost 5 whorls and measures—height, 36.0 mm.; greater diameter, 35.7 mm.; lesser diameter, 28.4 mm. It and three additional specimens collected by Von Möllendorff at Tayabas, Tayabas Province, Luzon, were distributed by him under the name of *Cochlostyla dubiosa* Pfeiffer.

The subspecies most nearly resembles *Cochlostyla submirabilis majayjayana*, from which it differs by its smaller size, less elevated spire, and much thinner shell.

COCHLOSTYLA SUBMIRABILIS ANTIMONANA, new subspecies

Plate 3, Figures 5–8

Shell broadly ovate, rather heavy. Nuclear whorls pale brown, the succeding whorls flesh colored, the last two straw-colored, deepening to pale orange near the aperture. The umbilical area has a narrow dark zone. A broad peripheral spiral band, a narrow one at the summit and one of intermediate width halfway between these are present. The peristome, which is rather obliquely protracted and flaring, is white and thick. The last turn shows numerous fine spiral hydrophanous lines. Where the thin periostracum has been removed the shell shows white.

The type, Cat. No. 392948, U.S.N.M., comes from the Quadras collection and was obtained at Antimonan, Tayabas Province, Luzon. It has 5.1 whorls and measures—height, 47.8 mm.; greater diameter, 40.2 mm.; lesser diameter, 32.7 mm.

The name bestowed upon it by Quadras was *Helicostyla dubiosa submirabilis*.

This subspecies diverges more than any other in the direction of elevation from the type that I have seen, being much more elevated than typical *Cochlostyla submirabilis submirabilis*. It goes as far in this extreme as those previously referred to tend toward depression.

Its broadly ovoid shape and large size differentiate from all the other subspecies.

COCHLOSTYLA SUBMIRABILIS DARAGANA, new subspecies

Plate 3, Figures 9–12

Shell helicoid, thin. Early whorls pale straw colored, the later of a more greenish yellow tinge, base still darker. Umbilical area pale brown, peripheral band bright chestnut brown, the narrow zone at the summit and the spiral band between this and the periphery a little paler than the peripheral zone. Peristome broadly expanded and somewhat protracted at the junction of the basal and outer lip, white. Inside of aperture bluish-white excepting the areas where the dark bands described above show through. The periostracum is thin and shows many fine, more or less wavy, spiral hydrophanous lines on spire and base.

The type, Cat. No. 312949, U.S.N.M., comes from the Quadras collection, where it bore the name *Helicostyla mirabilis*. It was collected at Daragua, Albany Province, Luzon. It has 4.5 whorls and measures—height, 33.0 mm.; greater diameter, 33.3 mm.; lesser diameter, 26.6 mm.

This subspecies resembles most nearly *Cochlostyla submirabilis submirabilis* from which it differs by its much thinner shell, much more depressed spire, and longer aperture.

COCHLOSTYLA SUBMIRABILIS SUBMIRABILIS Möllendorff

Plate 4, Figures 1–4

1891. *Cochlostyla dubiosa* HIDALGO, Obras. Malac., pp. 313–5, pl. 47, fig. 4
1897. *Cochlostyla dubiosa submirabilis* MÖLLENDORFF, Nachr. Deut. Malak. Ges., vol. 29, p. 128.
1898. *Cochlostyla dubiosa submirabilis* MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, p. 113.
1905. *Cochlostyla dubiosa submirabilis* MÖLLENDORFF, Kobelt and Winter, Semper. Reis. Arch. Philip., vol. 10, pt. 1, p. 151, pl. 30, fig. 3.

Shell ovate, rather thin. Early whorls flesh colored or pale brown. The succeeding turns straw-colored, deepening to brownish straw color on the last whorl. Umbilical area with a narrow brown zone. Periphery marked by a brown band; there is also a narrow zone of brown at the summit and another halfway between this and the

periphery. Peristome white, protracted at the junction of the outer and basal lip. Interior of aperture pearl gray excepting the dark spiral bands described above. There are many hydrophanous spiral lines and zones which are well shown in our figures.

The specimen figured, Cat. No. 195390, U.S.N.M., is one of four from the Möllendorf collection which came from Lopez, Tayabas Province, Luzon. It has 5.1 whorls and measures—height, 38.8 mm.; greater diameter, 33.8 mm.; lesser diameter, 28.7 mm.

This subspecies stands halfway between *Cochlostyla submirabilis antimonana* and *Cochlostyla submirabilis daragana* in shape.

COCHLOSTYLA MIRABILIS Ferussac

This species, like *Cochlostyla dubia* Pfeiffer, has also been battered from pillar to post and from almost its inception has been made the recipient of a number of subspecies belonging to *Cochlostyla persimilis* which in turn has been badly confused with what we are here calling *Cochlostyla submirabilis* Möllendorff.

In *Cochlostyla mirabilis* Ferussac the periostracum is almost wanting, the merest film of it, yellowish tinged, is present on the last portion of the shell and on the parietal wall of the aperture. In *Cochlostyla persimilis* the periostracum is always strongly developed on the last turn, ranging from straw colored to orange. Most writers appear to have considered *Cochlostyla mirabilis* typical to have lost the periostracum. That this is not the case is vouched for by the fact that the umbilical callus would have glazed over the part occupied by it and thus preserved this intact, which is not the case.

COCHLOSTYLA MIRABILIS MIRABILIS, Ferussac

Plate 4, Figures 5–10; Plate 5, Figures 1–6

1821. *Helix mirabilis* Ferussac, Tab. Syst. Anim. Moll., p. 47.
1821. *Helix mirabilis* Ferussac, Hist. Nat. Moc., pl. 31, figs. 4–6.
1822. *Helix galactites* Lamarck, Anim. Sans. Vert., vol. 6, p. 69.
1828. *Helix formosa* Wood, Ind. Test., Suppl., pl. 7, fig. 10.
1837. *Helicostyla galactites* Beck, Index Mol., p. 37.
1841. *Helix mirabilis* Sowerby, Proc. Zool. Soc. London, pp. 1–2.
1842. *Helix decipiens* Reeve, Conch. Syst., vol. 2, pl. 163, fig. 3.
1846. *Helix mirabilis* Pfeiffer, Martini-Chemnitz, Conch. Cab., ed. 2, vol. 1, pt. 12, p. 289, in part; pl. 48, figs. 5?, 6, 7?.
1848. *Helix mirabilis* Pfeiffer, Monogr. Helic. vivent., vol. 1, pp. 220–1, in part.
1850. *Helicostyla mirabilis* Albers, Heliceen, ed. 1, p. 104.
1850. *Helix galactites* Chenu, Conch. Ill., pl. 3, figs. 16, 16*a*, 17.
1851. *Helix galactites* Deshayes, Fer. Hist. Nat. Mol., vol. 1, pp. 319–20, in part, pl. 31, figs. 4–6.
1851. *Helix galactites* Reeve, Conch. Icon., pl. 12, figs. 45*a*, 45*b*, 45*g*.
1853. *Helix galactites* Pfeiffer, Mon. Helic. vivent., vol. 3, p. 172, in part.
1856. *Helicostyla mirabilis* Pfeiffer, Malacozool. Blät., vol. 2, p. 145.

1858. *Helicostyla mirabilis* H. and A. ADAMS, Gen. Rec. Mol., vol. 2, p. 192.
1859. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 4, p. 206, in part.
1860. *Helicostyla mirabilis* MARTENS, Albers, Heliceen, ed. 2, p. 175.
1867. *Cochlostyla mirabilis* MARTENS, Preus. Exp. Ost. Asiat. Zool., p. 89, in part.
1868. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 5, p. 274, in part.
1870. *Cochlostyla mirabilis* SEMPER, Reis. Phil., pt. 2, vol. 3, p. 192, in part.
1876. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 7, p. 318, in part.
1880. *Cochlostyla mirabilis* KOBELT, Ill. Conchyl., vol. 2, p. 256, pl. 78, fig. 5.
1881. *Cochlostyla mirabilis* PFEIFFER, Clessin Nomenclator, p. 205.
1887. *Cochlostyla mirabilis* HIDALGO, Journ. Conchyl., vol. 35, p. 144.
1891. *Cochlostyla mirabilis* PILSBRY, Tryon Man. Conch., ser. 2, vol. 7, pp. 181–3, pl. 57, figs. 83, 86.
1894. *Helicostyla mirabilis* PILSBRY, Man. Conch., ser. 2, vol. 9, p. 224.
1898. *Cochlostyla mirabilis* MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, p. 113, in part.
1901. *Cochlostyla mirabilis* HIDALGO, Obras Malac., p. 441, in part, pl. 49, figs. 1, 2, 3, 5.
1905. *Cochlostyla mirabilis* MÖLLENDORFF, Kobelt and Winter, Semper Reis. Arch. Philip., vol. 10, pt. 7, pp. 151–3.

Cochlostyla mirabilis Ferussac as figured by him is represented by our Figures 5–7 on Plate 4. This shell is white excepting the last half of the last turn which is pale yellow. The shell has a dark brown peripheral zone, a little paler narrower one at the summit and an intermediate one halfway between these. There is no definite dark area about the umbilicus, but the general coloration is of a little darker shade here. Some shells, like our Figures 8–10, Plate 4, lack all color bands. Figures 1–3, Plate 5, show a form in which a broad brown umbilical area with secondary bands is present, also a superipheral band within the aperture, while the band between the summit and periphery is absent. An extreme form of coloration is shown in Figures 4–6, Plate 5, where the spiral bands of brown become much expanded and completely cover the base.

This subspecies, represented by many specimens in our collection, comes from Albay Province, Luzon.

The specimen figured on Plate 4, Figures 5–7, representing Ferussac's figure, has 5 whorls and measures–height, 35.5 mm.; greater diameter, 31.1 mm.; lesser diameter, 26.1 mm.

It differs from *Cochlostyla mirabilis trichroa* Pilsbry by having the dark bands practically of the same shade of brown instead of light and dark spiral bands.

COCHLOSTYLA MIRABILIS TRICHROA Pilsbry

Plate 5, Figures 7–9

1851. *Helix mirabilis* REEVE, Conch. Icon., pl. 2, fig. 45*c*.
1851. *Helix mirabilis* DESHAYES, Fer. Hist. Nat. Mol., vol. 1, pp. 319–20, pl. 108*c*, figs. 3–4.
1853. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 3, p. 172, in part.
1859. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent,, vol. 4, p. 206, in part.

1887. *Cochlostyla mirabilis* HIDALGO, Journ. Conchyl., vol. 35, p. 44, in part.
1891. *Cochlostyla mirabilis trichroa* PILSBRY, Man. Conch., ser. 2, vol 7, p. 182, pl. 31, fig. 38.
1894. *Helicostyla mirabilis trichroa* PILSBRY, Man. Conch., ser. 2, vol. 9, p. 224.
1898. *Cochlostyla mirabilis trichroa* MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, p. 113.
1901. *Cochlostyla mirabilis trichroa* HIDALGO, Obras. Malac., pt. 1, p. 443, in part.
1909. *Cochlostyla mirabilis trichroa* MÖLLENDORFF, Kobelt and Winter, Semper Reis. Arch. Philip., vol. 10, pt. 7, p. 152, pl. 30, fig. 5.

Pilsbry in diagnosing this subspecies[2] says: "Having four wide or narrow blackish-brown bands, and three yellowish-brown bands in their intervals." This characterization equally defines the form to-day.

The typical form, Pilsbry says, comes from Albay. This is represented by Figures 7–9 on Plate 5. In some of our shells the light brown band between the peripheral and median is absent. Such a shell we have from the Quadras collection from Libmanan, Ambos Camarines, Luzon.

COCHLOSTYLA PERSIMILIS Ferussac

The shape of the shell in this species varies from helicoid to ovate. The shell is covered by a well developed translucent periostracum, which in most instances is lemon yellow, but in some subspecies darker shades, even a pale brownish tinge, are present. The shells may be unicolor, a brown umbilical area may be present and in addition to this a peripheral zone of brown, a zone of brown at the summit and one between this and the periphery may be present. Any one of these elements may be absent, but as a rule the members of the various subspecies show a tendency to be constant in whatever phase of coloration they may have acquired. Hydrophanous bands are absent. The aperture varies considerably in shape, in some races being considerably protracted at the junction of its outer and basal lip. Peristome thickened, expanded and reflected, white.

All the races here described come from southern Luzon excepting *Cochlostyla persimilis boacana*, which comes from Marinduque.

COCHLOSTYLA PERSIMILIS PERSIMILIS Ferussac

Plate 6, Figure 7–9

1846. *Helix mirabilis* PFEIFFER, Martini-Chemnitz, Conch. Cab., ed. 2, vol. 1, pt. 12, p. 289, in part, pl. 48, fig. 8.
1850. *Helix persimilis* FERUSSAC, Hist. Nat. Mol., vol. 1, p. 320, pl. 108C, figs. 5 and 6.
1851. *Helix mirabilis* REEVE, Conchol. Icon., pl. 12, fig. 45*d*.
1853. *Helix persimilis* var. d. PFEIFFER, Mon. Helic. vivent., vol. 3, p. 172.
1859. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent, vol. 4, p. 206, in part.

[2] Man. Conch. ser. 2, vol. 7, p. 182.

1868. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent, vol. 5, p. 274, in part.
1876. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent, vol. 7, p. 318, in part.
1887. *Cochlostyla mirabilis* HIDALGO, Journ. Conchyl., vol. 35, p. 144, in part.
1894. *Helicostyla mirabilis* PILSBRY, Man. Conch., ser. 2, vol. 9, p. 224.
1898. *Cochostyla mirabilis persimilis* MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 32, p. 113.
1901. *Cochlostyla mirabilis* HIDALGO, Obras. Malac., p. 442, in part.
1901. *Cochlostyla boettgeriana* HIDALGO, Obras. Malac., p. 444, in part, pl. 50, fig. 6?.
1905. *Cochlostyla mirabilis* MÖLLENDORFF, Kobelt and Winter, Semper Reis. Arch. Philip., vol. 10, pt. 7, pp. 151–2.

Shell rather large, broadly ovate. Tip flesh colored, the succeeding turns yellow, slowly grading to pale brownish-yellow on the last part of the last whorl. Umbilical area brown, the brown may be obscured by the umbilical callus; peripheral, median, and band at the summit present, usually grading in shade in the order mentioned from dark to lighter. Aperture produced, peristome expanded, thickened and reflected, white. Interior of aperture bluish-white, excepting where the dark bands show through the substance of the shell.

The specimen figured, Cat. No. 312953, U.S.N.M., corresponds well with Ferrussac's illustration. It has 5.1 whorls and measures—height, 44.2 mm.; greater diameter, 38.9 mm.; lesser diameter, 32.5 mm. This is the largest of the races before me. Our material lacks a specific locality. The determination of its exact habitat will therefore have to be left to the future.

Its large size and ovate form readily distinguish it from the other known races.

COCHLOSTYLA PERSIMILIS CALLIPEPLA, new subspecies

Plate 6, Figures 1–3

1846. *Helix mirabilis* PFEIFFER, Martini-Chemnitz, Conch. Cab., ed. 2, vol. 1, pt. 12, pp. 288–9, in part, pl. 48, fig. 10.
1850. *Helix mirabilis* FERUSSAC, Hist. Nat. Mol., vol. 1, p. 319, in part, pl. 107A, figs. 1, 2.
1853. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 3, p. 172, in part, pl. 108A, figs. 17? 18?.
1859. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 4, p. 206, in part.
1867. *Cochlostyla mirabilis* MARTENS, Preus. Exp. Ost. Asiat., pp. 89–90, pl. 19, fig. 2.
1887. *Cochlostyla mirabilis* HIDALGO, Journ. Conchyl., vol. 35, p. 144, in part.
1891. *Cochlostyla mirabilis* PILSBRY, Tryon, Man. Conch., ser. 2, vol. 7, p. 182.
1898. *Cochlostyla mirabilis* MÖLLENDORFF, Abhand. Naturf. Ges. Gölitz, vol. 22, p. 113, in part.
1901. *Cochlostyla mirabilis* HIDALGO, Obras Malac, p. 443, in part.

Shell rather small, broadly ovate, early whorls white, succeeding turns pale green, grading to olivaceous-yellow on the last part of the last turn. In all our specimens the umbilical area is *not* dark. In

the type the peripheral, median, and brown band at the summit are present. Aperture rather effuse, peristome broadly expanded, thickened, and reflected, white.

The type, Cat. No. 312954, U.S.N.M., has 4.8 whorls and measures—height, 34.7 mm.; greater diameter, 32.0 mm.; lesser diameter, 27.0 mm. Seven additional specimens seem to vary little from these dimensions.

The type was collected by Cuming at Albay, Albay Province, Luzon.

In one of our specimens the median spiral band of brown is absent, while in another it is indicated by a mere trace. Still another individual lacks all bands.

This is the smallest of the known races excepting *Cochlostyla persimilis acrybia* from which it can be distinguished at a glance by its different form.

COCHLOSTYLA PERSIMILIS PHARCIDA, new subspecies

Plate 6, Figures 4–6

Shell small, thin, ovate. Early whorls white, grading gradually through yellow to olivaceous yellow in the last part of the last turn. An obscure, narrow, darkish area is present in the umbilical region, while the peripheral band is also faint and the median and band at the summit are scarcely indicated. Aperture effuse anteriorly, peristome expanded, thickened and reflected, with the interior of aperture bluish-white. The real distinguishing feature of this race, however, is the decidedly malleated surface of the last rurn.

The type, Cat. No. 105286*a*, U.S.N.M., comes from Albay Province, Luzon. It has 5 whorls and measures—height, 37.3 mm.; greater diameter, 31.5 mm.; lesser diameter, 26.4 mm.

The malleated surface combined with the ovoid shape will differentiate this from the other race.

COCHLOSTYLA PERSIMILIS DONSALANA Bartsch

Plate 7, Figures 1–3

1918. *Cochostyla mirabilis donsalana* BARTSCH, Proc. Biol. Soc. Wash., vol. 31, pp. 153–4.

Shell elongate-ovate, moderately thick, early whorls white, grading through wax yellow to pale olive at the aperture. The shell may be without bands, or a mere line of brown may be present at the summit and another halfway between this and the periphery. No dark area bounds the umbilicus. Aperture very oblique and effuse anteriorly; peristome expanded and reflected, white. Interior of aperture bluish-white.

The type, Cat. No. 219021, U.S.N.M., has 5 whorls and measures—height, 43.6 mm.; greater diameter, 35.6 mm.; lesser diameter, 30.0 mm.

The elongate form, very oblique, aperture and reduced color bands characterize this race, which comes from Donsal, Sorsogon Province, Luzon.

COCHLOSTYLA PERSIMILIS CALLIMORPHA, new subspecies

Plate 7, Figures 4–9

1851. *Helix mirabilis* REEVE, Conch. Icon., pl. 12, fig. 45c.
1851. *Helix mirabilis*, FERUSSAC, Hist. Nat. Mol., vol. 1, pp. 319–320, in part, pl. 108C, figs. 8, 9.
1853. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 3, p. 172, in part, pl. 110B, fig. 2.
1859. *Helix mirabilis* PFEIFFER, Mon. Helic. vivent., vol. 4, p. 206, in part.
1887. *Cochlostyla mirabilis* HIDALGO, Journ. Conchyl., vol. 35, p. 144, in part.
1907. *Cochlostyla mirabilis* HIDALGO, Obras. Malac., p. 444, in part.

Shell rather large, subglobose, early whorl pale brown or white, the later turns may be soiled white with a yellowish tinge, pale straw-colored, wax yellow, or almost orange in general tone. In all our shells there is a dark umbilical area and in all, even those that appear unicolor, at least a slender thread of brown is apparent at the summit. The peripheral zone of brown may be present or absent, the same is true of the spiral band between the periphery and the summit. All three spiral bands are broad and very pronounced in some shells. Aperture large, broad. Peristome expanded, thickened, and reflected, white.

I have selected a dark colored specimen as type, Cat. No. 312955, U.S.N.M., which is figured on Plate 7, Figures 4–6. This has 5 whorls and measures—height, 39.7 mm.; greater diameter, 34.6 mm.; lesser diameter, 29.8 mm. Another specimen showing the full banding is shown on Plate 7, Figures 7–9.

This race, which also comes from somewhere in Albay Province, Luzon, resembles most nearly *Cochlostyla persimilis callipepla*, from which its much larger size will distinguish it at once.

COCHLOSTYLA PERSIMILIS PODAGRA, new subspecies

Plate 8, Figures 7–9

Shell helicoid, thin. Early whorls pale yellow, the succeeding turns gradually becoming darker, grading to brownish green on the last portion of the last whorl. The area about the umbilicus is dark chestnut brown, a band of the same color marks the periphery and another of the same shade is a little nearer the peripheral band than the slightly paler one at the summit. In the type an additional, very pale brown zone is present halfway between the band at the

summit and the median band on the last two whorls. Aperture broad, peristome moderately expanded and reflected but only slightly thickened.

The type, Cat. No. 312957, U.S.N.M., bears the label Luzon. It has 4.7 whorls and measures—height, 34.3 mm.; greater diameter, 36.4 mm.; lesser diameter, 28.8 mm.

A young specimen which I believe belongs here was collected by Col. E. A. Mearns and bears the label Tibi and Pili Hot Spring, Albay Province, Luzon.

The helicoid form distinguishes this race from the others described.

COCHLOSTYLA PERSIMILIS ACRYBIA, new subspecies

Plate 8, Figures 4–6

1851. *Helix mirabilis*, Ferussac, Hist. Nat. Mol., vol. 1, pp. 319–20, pl. 108B figs. 9–10.

Shell small, ovate. Early whorls brown or white, the rest yellow with a brownish-orange tinge. Umbilical zone brown, peripheral and median bands broad, while the band at the summit is rather narrow. All bands dark chestnut brown. Aperture rather narrow; peristome and interior of aperture bluish white.

The type, Cat. No. 312958, U.S.N.M., has 5.1 whorls and measures—height, 34.2 mm.; greater diameter, 28.5 mm.; lesser diameter, 25.9 mm.

This subspecies suggests in form *Cochlostyla metaformis*, from which, of course, the columella will at once distinguish it. Its general shape is different from all other races described so that it can not be confused with them.

COCHLOSTYLA PERSIMILIS BOACANA, new name

Plate 8, Figures 1–3

1846. *Helix mirabilis* Pfeiffer, Martini-Chemnitz, Conch. Cab., ed. 2, vol. 1, pt. 12, pp. 288–9, in part, pl. 48, fig. 9.
1851. *Helix mirabilis* Reeve, Conch. Icon., pl. 12, fig. 45*f*.
1853. *Helix mirabilis* Pfeiffer, Mon. Helic. vivent., vol. 3, p. 172, in part.
1859. *Helix mirabilis* Pfeiffer, Mon. Helic. vivent, vol. 4, p. 206, in part.
1887. *Cochlostyla mirabilis* Hidalgo, Journ. Conchyl., vol. 35, p. 144, in part.
1891. *Cochlostyla mirabilis* Pilsbry, Man. Conch., ser. 2, vol. 7, p. 182, pl. 57, fig. 80.
1898. *Cochlostyla mirabilis crassa* Möllendorff, Abhand. Naturf. Ges. Görlitz, vol. 22, p. 113, not *Cochlostyla intoria crassa* Möllendorff, Berichte Senckenberg Naturf. Ges., p. 232. 1890.
1909. *Cochlostyla mirabilis* Möllendorff, Kobelt and Winter, Semper Reis. Arch. Phillip., vol. 70, pt. 7, pp. 152–3, pl. 30, fig. 6.

Möllendorff in creating *Cochlostyla mirabilis crassa* in 1898 failed to remember that he had already employed the name *crassa* in the

genus *Cochlostyla* in 1890 for *Cochlostyla intorta crassa*, which makes it necessary to rechristen it. I have selected the subspecific name *boacana* because most of the material in our collection has come from the vicinity of Boac.

This subspecies is characterized by having the dark bands exceedingly broad, their total surface sometimes equals or probably exceeds that of the light areas. As a rule, four zones are present, that is the umbilical, peripheral, intermediate, and the band at the summit. There is only one specimen in our collection in which this phase of coloration does not obtain. In this a narrow zone at the umbilicus and a very narrow line at the summit are dark colored. Even here, however, the other two bands are indicated as mere shadows. The periostracum varies considerably in tint, ranging from lemon yellow to pale brownish-orange. Peristome white. Interior of aperture bluish-white excepting the areas occupied by the dark spiral bands.

The specimen figured has 4.9 whorls and measures—height, 33.6 mm.; greater diameter, 32.8 mm.; lesser diameter, 27.0 mm. The largest specimen before me has 5.1 whorls and measures—height, 35.7 mm.; greater diameter, 34.8 mm.; lesser diameter, 30.1 mm. The smallest specimen has 4.6 whorls and measures—height, 27.0 mm.; greater diameter, 29.7 mm.; lesser diameter, 23.0 mm.

The extremely dark coloration distinguishes this race from all the others.

OBBA GALLINULA MAJAYJAYANA, new subspecies

Plate 4, Figures 11–13

Shell similar to *Obba gallinula convexospira* Möllendorff, differing from this by being less convex, that is, more depressed, by having the dorsal dark spiral band a little more median and the ventral dark spiral band broader and a little more median. The open umbilicus is also a trifle wider in our shells.

The type, Cat. No. 322962, U.S.N.M., and two paratypes in the collection of the Philippine Bureau of Science were collected by Dr. C. F. Baker. The type has 4.8 whorls and measures—height, 10.0 mm.; greater diameter, 26.9 mm.; lesser diameter, 22.0 mm. The paratypes have 4.9 and 4.6 whorls, respectively, and measure—height, 11.3 and 10.1 mm.; greater diameter, 27.3 and 27.4 mm.; lesser diameter, 22.4 and 23.3 mm., respectively.

LEPTOPOMA McGREGORI, new species

Plate 9, Figures 4–6

Shell small, helicoid, thin, yellowish horn colored. In the type a rather broad chestnut-brown band is present, which extends over the periphery and the posterior portion of the base, and a series

of distantly spaced brown spots from an interrupted band at the summit of the last turn. The nuclear whorls merge imperceptibly into postnuclear turns. The first half turn smooth, after which the sculpture characteristic of the succeeding whorls begins. Postnuclear whorls well rounded, marked by four strong spiral threads, which occupy the anterior two-thirds of the turns. The heaviest of these is at the periphery where it forms a decided keel; the other three, which are of equal strength, are also about equally spaced. In addition to this sculpture the whorls are marked by fine, quite regular, rather closely spaced spiral threads. The axial sculpture consists of fine, closely approximated, retractively slanting threads, which lend to the shell a silky luster. Base rather depressed, well rounded, marked by a cord equaling those posterior to the periphery and a little farther removed from the periphery than the first post peripheral cord is separated from this. The rest of the base is marked by closely spaced spiral threads, which are a little stronger than those on the spire. The base is narrowly openly umbilicated. Aperture large, subcircular; peristome white, very broadly flaringly expanded, marked by concentric lines of growth, the columellar portion being also reflected to more than half cover the umbilicus. Parietal wall glazed with a thin callus.

The type, Cat. No. 312965, U.S.N.M., was collected by R. C. McGregor, for whom I take pleasure to name it, on Mount Banahao, Luzon. It has 5 whorls, and measures—height, 10.0 mm.; greater diameter, 10.5 mm.; lesser diameter, 8.0 mm.

The paratype in the possession of the Philippine Bureau of Science lacks the spiral color band of the base, but has the series of brown spots described for the type continued as axial bands across the last three whorls where they extend to the periphery in a zigzag manner. This specimen is a little larger than the type. It has lost the early whorls. It measures—greater diameter, 11.4 mm.; lesser diameter, 9.0 mm.

This species approximates *Leptopoma cuticulare* Möllendorff. A specimen of this collected by Quadras at Mount Limuton, Morong District, can be distinguished at once from the present race by the presence of a second strong spiral cord on the base.

SULFURINA CITRINELLA BANAHAOANA, new subspecies

Plate 9, Figures 1–3

Shell similar to *Sulfurina citrinella pagbilaoensis* Bartsch but a little more convex and in every way larger; also of much darker coloration, the shade here being pale orange.

The type, Cat. No. 312966, U.S.N.M., has 4.5 whorls and measures—height, 6.4 mm.; greater diameter, 9.0 mm.; lesser diameter, 7.0 mm.

An additional specimen, Cat. No. 312967, U.S.N.M., is also in the collection of the National Museum, while two paratypes are in the collection of the Philippine Bureau of Science.

The specimens were collected by R. C. McGregor on Mount Banahao, Luzon.

Plate 9, Figures 7–9, illustrates *Sulfurina citrinella pagbilaoensis* for comparison.

EXPLANATION OF PLATES

All figures are somewhat reduced, excepting Plate 9, in which the figures are much enlarged

PLATE 1

FIGS. 1–4. *Cochlostyla dubiosa dubiosa* Pfeiffer.
5–8. *Cochlostyla dubiosa capulensis* Bartsch.
9–12. *Cochlostyla dubiosa volubilis* Reeve.

PLATE 2

FIGS. 1–4. *Cochlostyla submirabilis banosana* Bartsch.
5–8. *Cochlostyla submirabilis majayjayana* Bartsch.
9–12. *Cochlostyla submirabilis lucbana* Bartsch.

PLATE 3

FIGS. 1–4. *Cochlostyla submirabilis tayabasana* Bartsch.
5–8. *Cochlostyla submirabilis antimonana* Bartsch.
9–12. *Cochlostyla submirabilis daragana* Bartsch.

PLATE 4

FIGS. 1–4. *Cochlostyla submirabilis submirabilis* Möllendorff.
5–7. *Cochlostyla mirabilis mirabilis* Ferussac (after Ferussac).
8–10. *Cochlostyla mirabilis mirabilis* Ferussac (lacking color bands).
11–13. *Obba gallinula majayjayana* Bartsch.

PLATE 5

FIGS. 1–3. *Cochlostyla mirabilis mirabilis* Ferussac (extreme of coloration).
4–6. *Cochlostyla mirabilis mirabilis* Ferussac (extreme of coloration).
7–9. *Cochlostyla mirabilis trichroa* Pilsbry.

PLATE 6

FIGS. 1–3. *Cochlostyla persimilis callipepla* Bartsch.
4–6. *Cochlostyla persimilis pharcida* Bartsch.
7–9. *Cochlostyla persimilis persimilis* Ferussac.

PLATE 7

FIGS. 1–3. *Cochlostyla persimilis donsalana* Bartsch.
4–6. *Cochlostyla persimilis callimorpha* Bartsch. Type.
7–9. *Cochlostyla persimilis callimorpha* Bartsch. (Showing full banding.)

PLATE 8

FIGS. 1–3. *Cochlostyla persimilis boacana* Bartsch.
4–6. *Cochlostyla persimilis acrybia* Bartsch.
7–9. *Cochlostyla persimilis podagra* Bartsch.

PLATE 9

FIGS. 1–3. *Sulfurina citrinella banahaoana* Bartsch.
4–6. *Leptopoma mcgregori* Bartsch.
7–9. *Sulfurina citrinella pagbilaoensis* Bartsch.

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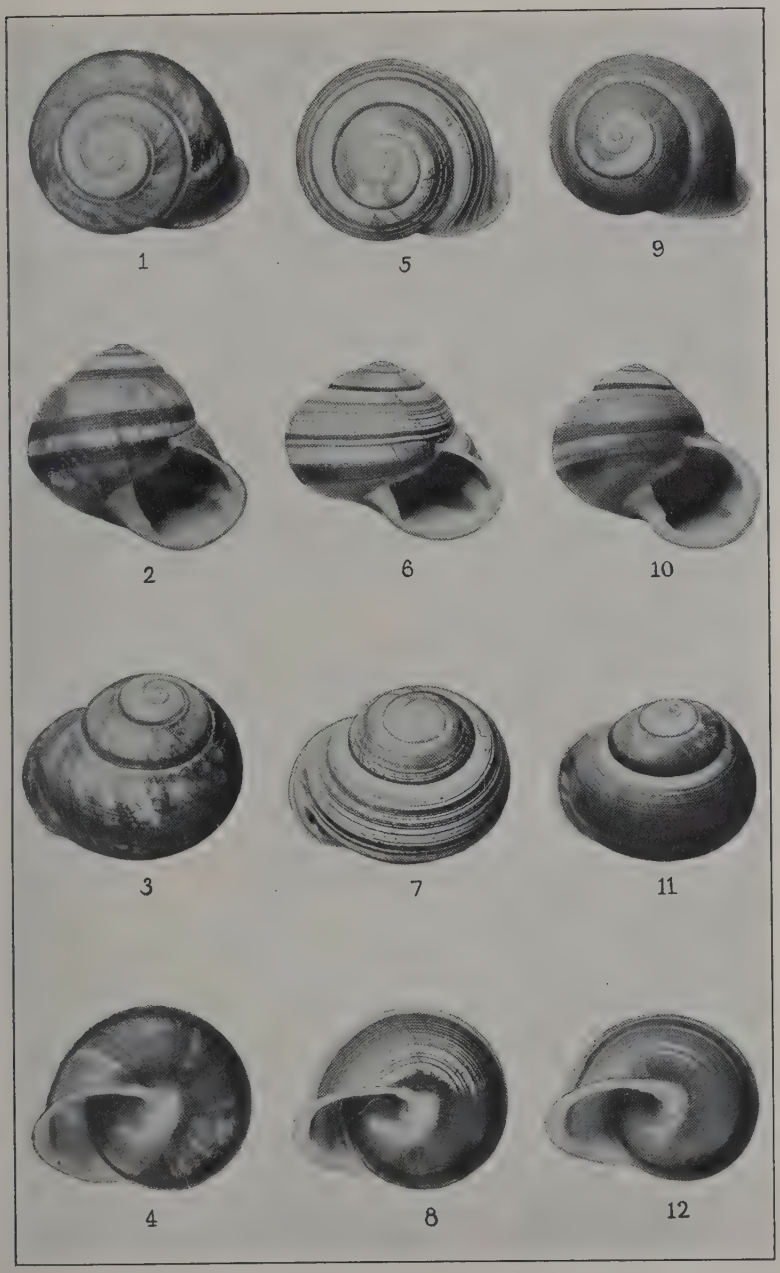
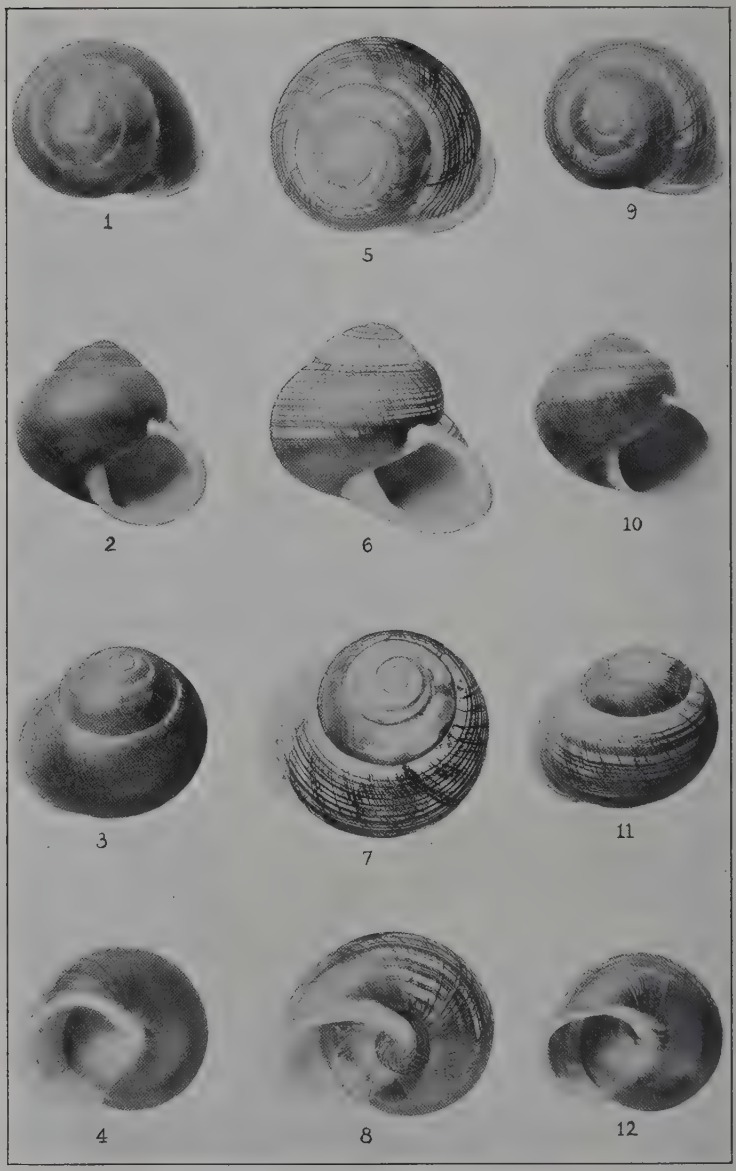


LAND SHELLS FROM THE ISLAND OF LUZON

FOR EXPLANATION OF PLATE SEE PAGE 19.



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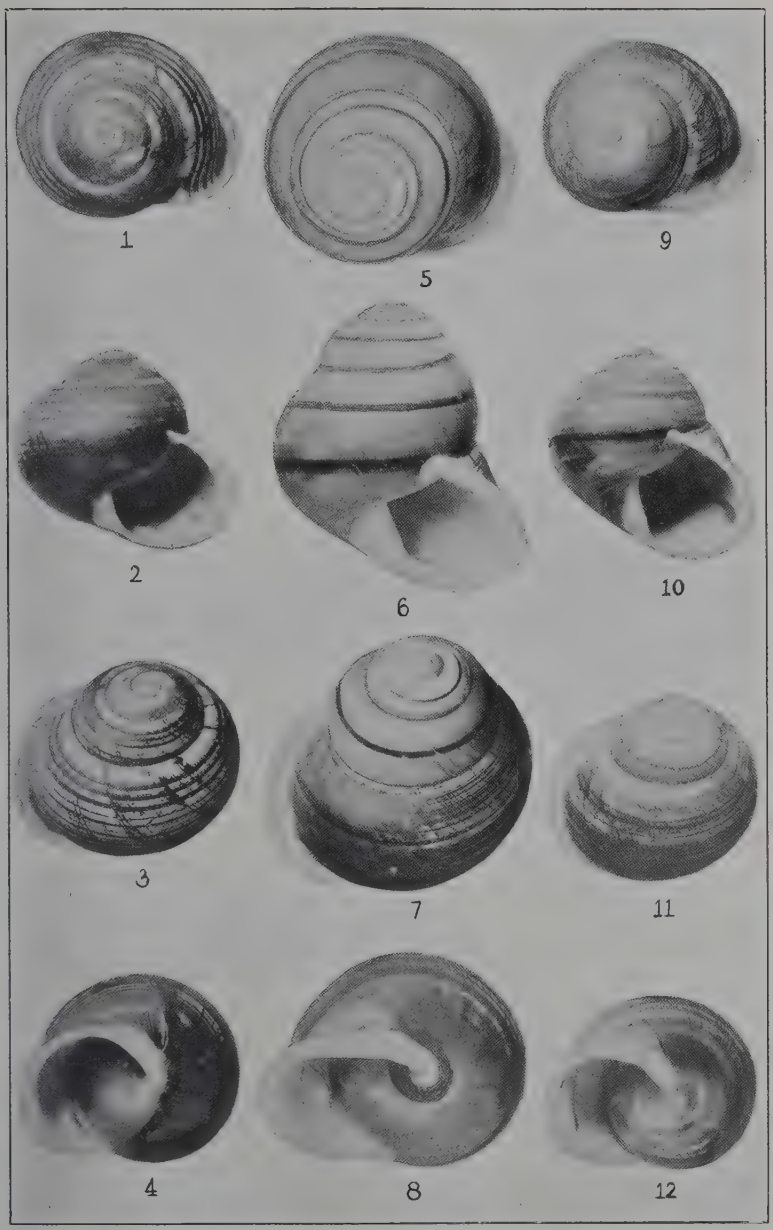

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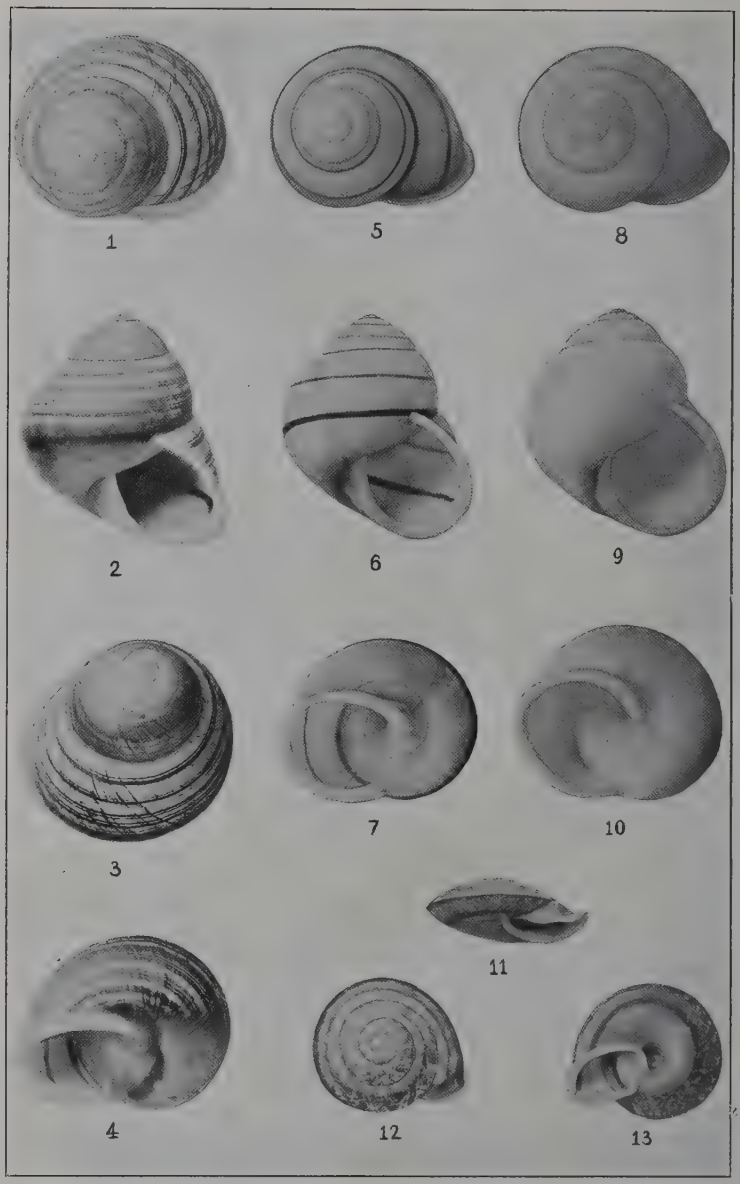

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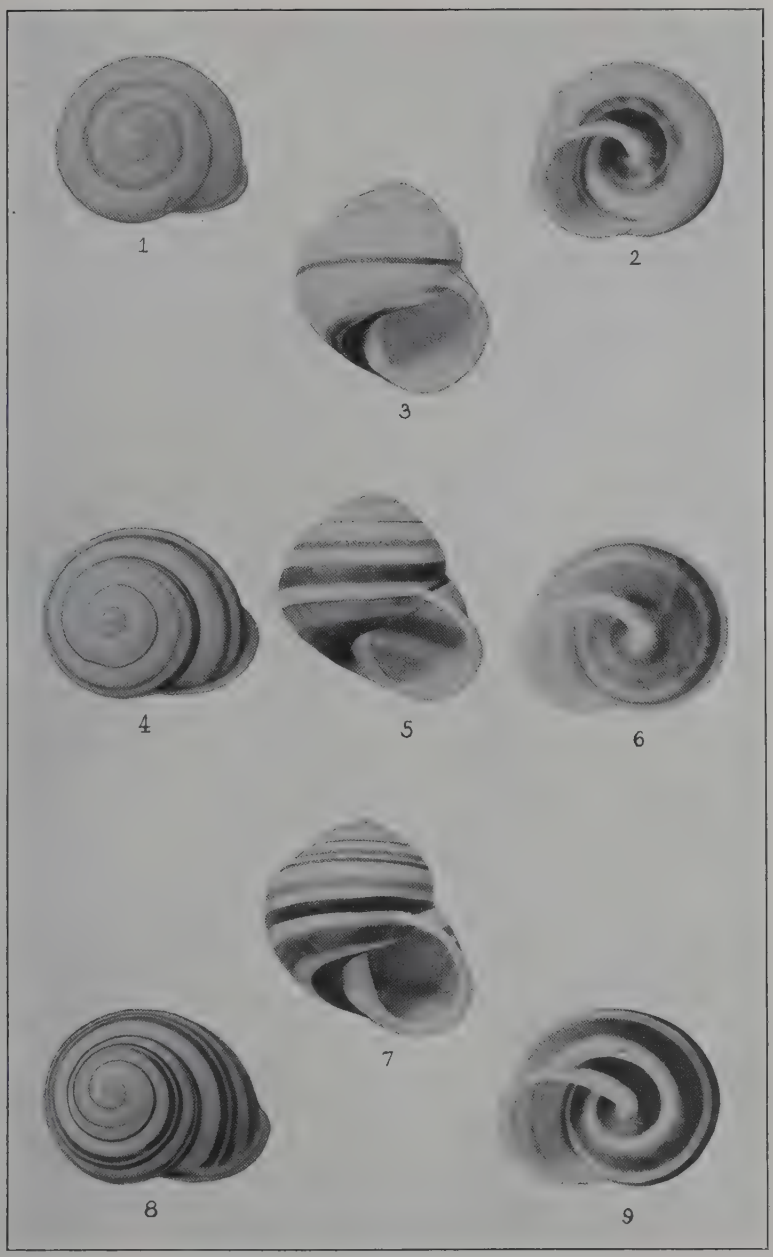

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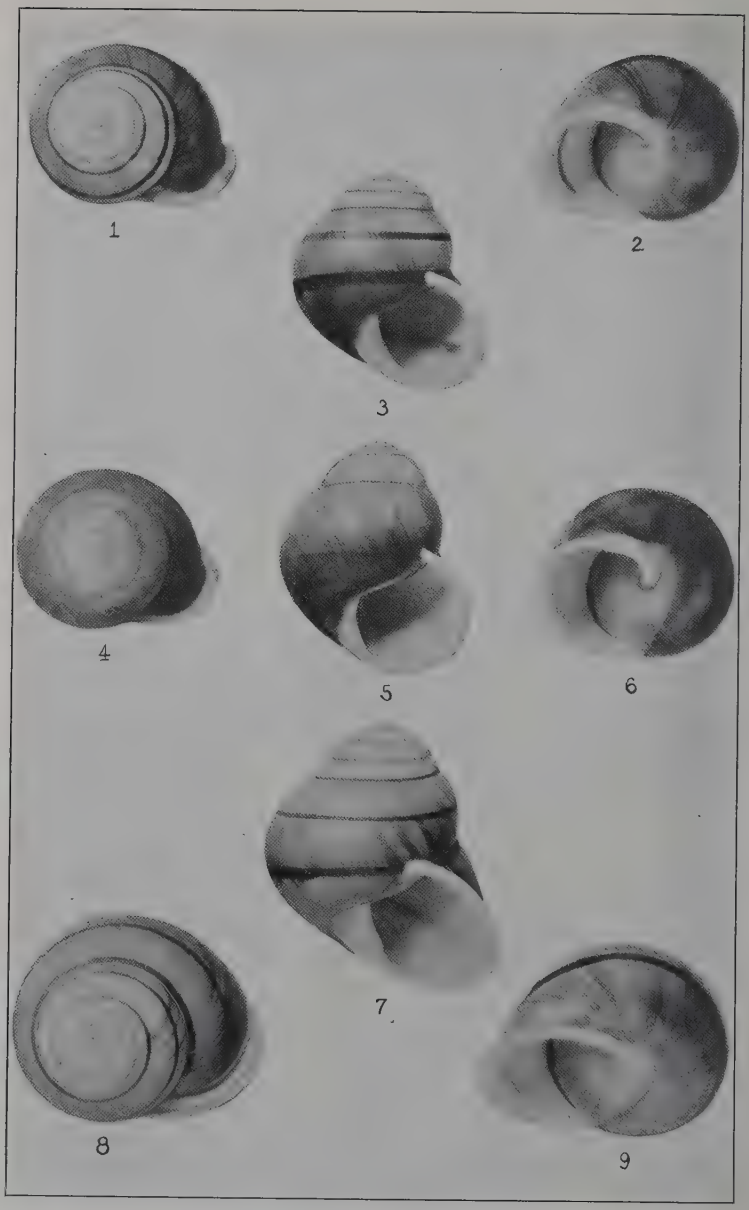

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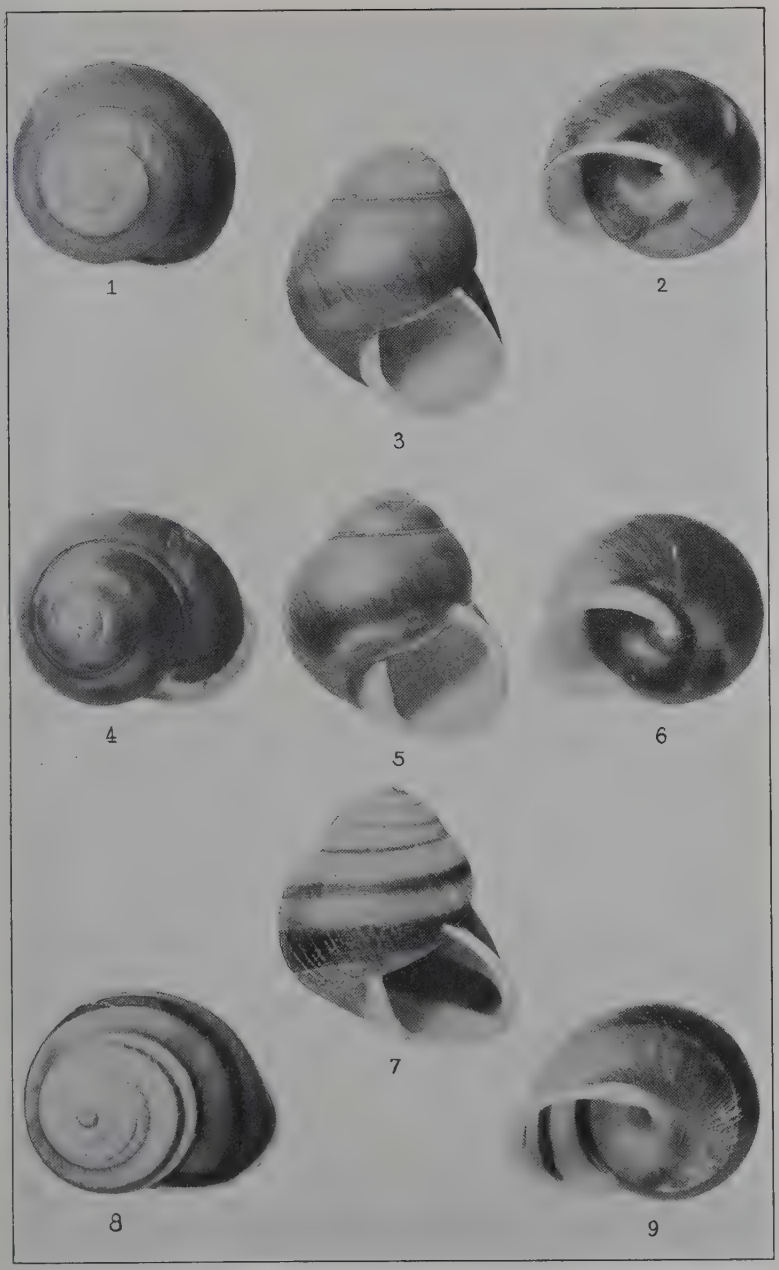
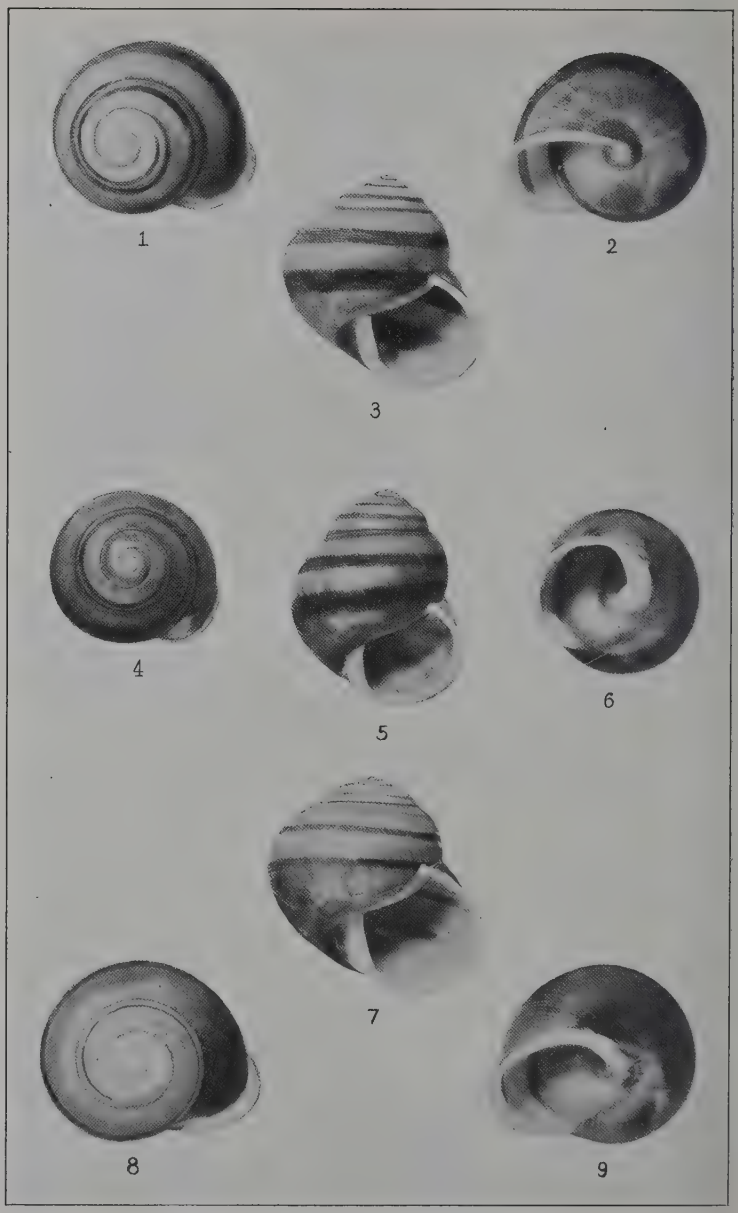


LAND SHELLS FROM THE ISLAND OF LUZON

FOR EXPLANATION OF PLATE SEE PAGE 20.



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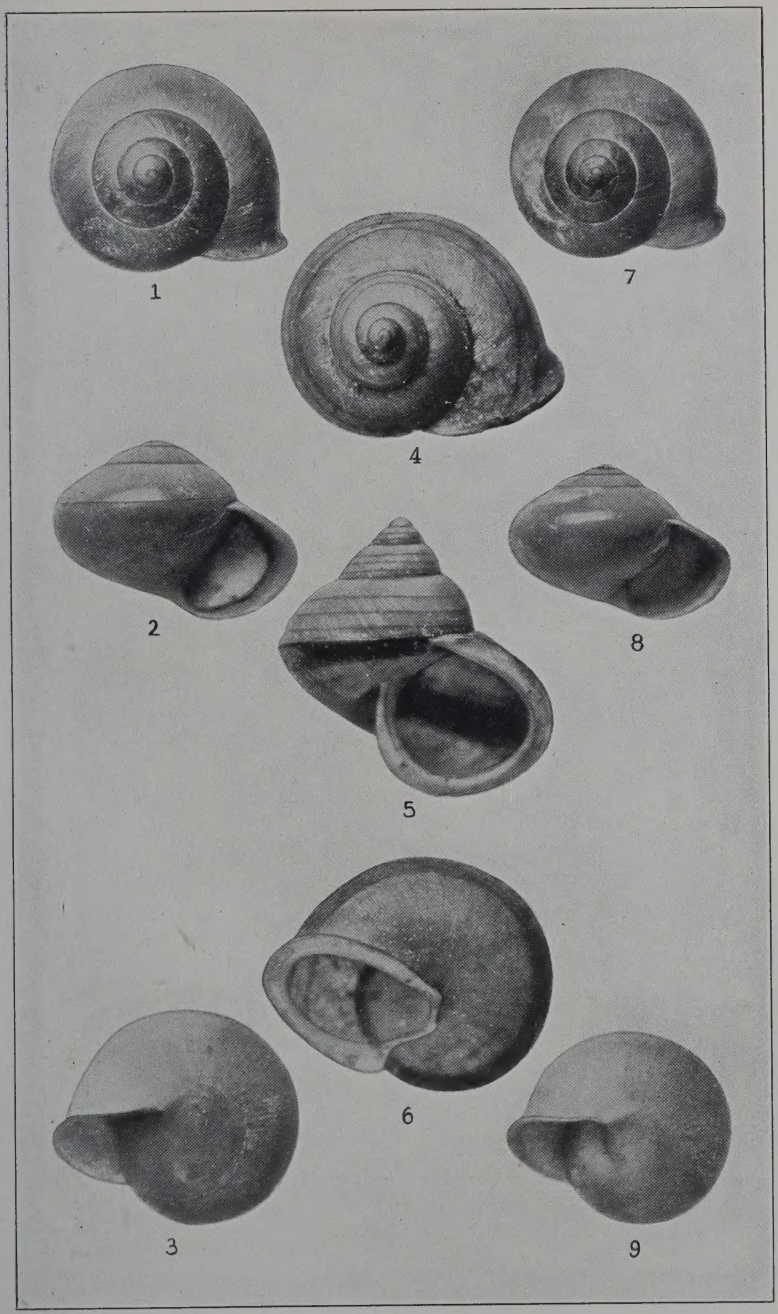
FOR EXPLANATION OF PLATE SEE PAGE 20.



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